CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO.
MONITORING AND REPORTING PROGRAM
CITY OF RIO VISTA
RIO VISTA LANDFILL
CLASS III LANDFILL
POST-CLOSURE MAINTENANCE
AND CORRECTIVE ACTION
SOLANO COUNTY

The 12-acre, unlined municipal solid waste (MSW) landfill operated from the mid-1940s through 1992 and was closed with a clay cover in 2002. The 20-acre site includes the landfill, access roads, drainage facilities, two storm water collection ponds, gas vents and monitoring wells, and groundwater monitoring wells. The direction of groundwater flow varies from north to north-northeast. The depth to groundwater is about 30 to 40 feet below natural grade. The minimum separation between the base of the landfill and historical high groundwater is about 10 feet. Groundwater monitoring data shows an historical release from the landfill consisting of general minerals, including total dissolved solids (1,200 mg/L), chloride (225 mg/L), sulfate (150 mg/L) and alkalinity (760 mg/L). Time series plots show moderate improvement in groundwater quality since 1998 but do not yet indicate any observable improvement attributable to landfill closure in 2002.

Pursuant to Section 20080(g) of Title 27, the Discharger shall maintain water quality monitoring systems for background and corrective action monitoring. Compliance with this MRP is ordered by Waste Discharge Requirements (WDRs) Order No. ___.

A. SUMMARY OF MONITORING & REPORTING FREQUENCIES

Table A

Section	Reporting	Frequency
B.	Periodic Reports:	
	1. Semiannual Report	Semiannually
	2. Annual Monitoring Summary Report	Annually
	3. Constituents of Concern Report	Every 5 years
C.	Water Quality Protection Standard Report	Update as necessary

Section	Monitoring	Frequency
D.	Leachate Monitoring	Same as F.1
E.	Groundwater Monitoring:	
	1. Elevation	Quarterly
	2. Background & Corrective Action Monitoring	Semiannually
	3. Constituents of Concern	Every 5 years

F. Facility Monitoring:

1. Standard Observations	
A. Wet Season	Monthly
B. Dry Season	Quarterly
2. Maintenance Inspections	Quarterly
3. After Significant Storm Events	Within 7 Days After Event
4. Site Winterization	Annually

B. REPORTING

1. Semiannual Reports

The Discharger shall report monitoring data and information as required in this Monitoring and Reporting Program and as required under Order No. ___ and the Standard Provisions and Reporting Requirements (April 2000). Reports shall be submitted **semiannually**. Each semiannual monitoring report shall include the following information:

A. A compliance evaluation summary for the monitoring period.
B. A tabular summary of well information from the installation logs, including well name, top-of-casing elevation, total depth, depths/elevations of screened interval, aquifer or zone (i.e. uppermost), and soil type(s) over the screened interval.
C. The results of groundwater elevation monitoring.
D. Tabular summaries of corrective action monitoring data for each unit showing sampling dates, well, constituents, concentrations, and concentration limits. The table shall also clearly show whether new monitoring data exceedances occurred during the monitoring period (i.e. highlight exceedances).
E. Contaminant contour maps of representative corrective action monitoring data, showing the estimated extent of the contaminant plume.
F. Tables of historical monitoring data for each unit showing well, sampling dates, constituents, concentrations, and concentration limits. The data shall be presented so as to clearly show historical concentrations at each well.
G. Plots, graphical summaries and a narrative discussion of the results of correction action monitoring, as specified in Section E.3 herein.
H. Field and laboratory tests sheets.
I. An electronic copy of the data in a digital format acceptable to the Executive Officer.

At least one semiannual monitoring report each year shall include a copy of the Sample Collection and Analysis Plan (sampling plan) referenced under WDR Monitoring Specification E.5.

2. Annual Monitoring Summary Report

An Annual Monitoring Summary Report (Annual Report) shall also be prepared and submitted in accordance with this section of the MRP and Reporting Requirement F.6 of the WDRs. The report shall summarize monitoring results for the prior year and include a discussion of compliance with the WDRs and the Water Quality Protection Standard. The report shall contain both tabular and graphical summaries, including time

series plots of historical monitoring data (including the prior year's data) for each monitoring parameter/COC. For corrective action monitoring data, the report shall also include the following:

A. A summary of the results of trend analysis performed on each constituent of the release during the prior year
B. A summary of the results of water chemistry analysis of water quality data collected during the prior year.
C. Contaminant contour maps for representative constituents (e.g. TDS and chloride) constructed as part of semiannual reporting during the prior year and a discussion as to whether the size of the plume and concentrations within have increased, decreased, or remained the same since the previous monitoring year.

The Annual Report may be included in the Second Semiannual Report for each year.

Reports which do not comply with the above-required format will be **REJECTED** and the Discharger shall be deemed to be in noncompliance with the waste discharge requirements. The semiannual and annual reports shall be submitted to the Board in accordance with the following schedule for the calendar period in which samples were taken or observations made:

Table B

Report	End of Reporting Period	Date Report Due
First Semiannual	30 June	**31 July**
Second Semiannual	31 December	**31 January**
Annual Report	31 December	**31 January**

C. WATER QUALITY PROTECTION STANDARD (Section 20390)

The Water Quality Protection Standard (WQPS) shall consist of all Constituents of Concern, Concentration Limits for each constituent of concern, Monitoring Points, Point of Compliance, and the Compliance Period.

1. Constituents of Concern (Section 20395 of Title 27)

The constituents of concern (COCs) for the landfill shall be as follows:

Table C

Constituents of Concern	**Units**	**Test Method**
Field Parameters:	See Attachment D	
General Minerals:	See Attachment D	
Inorganics (dissolved)	µg/L	See Attachment D
Volatile Organic Compounds	µg/L	USEPA Method 8260B
Semi-Volatile Organic Compounds	µg/L	USEPA Method 8270
Organophosphorus Pesticides	µg/L	USEPA Method 8141A
Chlorinated Herbicides	µg/L	USEPA Method 8151
Organochlorine Pesticides	µg/L	USEPA Method 8081A
Polychlorinated Biphenols (PCBs)	µg/L	USEPA Method 8082

2. Concentration Limits (Section 20400)

a. For VOCs and other organic COCs the concentration limit shall be the MDL.
b. For inorganic monitoring parameters and COCs for which at least 10% of the data from background samples equal or exceed their respective MDL, the concentration limit shall be determined as follows:
   i. Using the Tolerance Interval statistical procedure applied to historical background data, or
   ii. Using an alternative statistical method approved by the Executive Officer per Monitoring Specification E.17 of the WDRs.
c. For inorganic monitoring parameters and COCs for which less than 10% of the data from background samples equal or exceed their respective MDL, the concentration limit shall be the PQL.

Prior to calculating/updating concentration limits, background data shall be screened for significant rising or falling trends. If a significant trend is identified that reflects changes in background conditions, the trend data shall be used to update concentration limits. Otherwise concentration limits shall be developed only from prior historical data. Tolerance limits shall take into account seasonality.

3. Monitoring Points (Section 20405)
The monitoring points for groundwater monitoring shall be as listed in Table E.3A herein.

4. Point of Compliance (Section 20405)
The point of compliance (POC) for the water standard is a vertical surface located at the hydraulically down gradient limit of the Unit that extends through the uppermost aquifer underlying the Unit. The POC wells for the unit shall be MWs-1 and 5.

5. Compliance Period (Section 20410)
The compliance period for each Unit shall be the number of years equal to the active life of the Unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the Unit. The compliance period shall begin anew each time the Discharger confirms a new release from the unit.

D. LEACHATE MONITORING

The Discharger shall monitor the landfill for leachate seeps **monthly** during the wet season and **quarterly** during the dry season as part of standard observations. Any leachate seeps observed during these inspections or at any other time shall be sampled and analyzed for the constituents of concern referenced in Table C herein. Reporting shall be conducted in accordance with Reporting Requirement F.10 of the WDRs.

E. GROUNDWATER MONITORING

1. Groundwater Elevation Monitoring (Section 20415(e)(13))

The groundwater surface elevation (in feet and hundredths, MSL) in all wells and piezometers shall be measured on a **quarterly** basis. Groundwater elevations taken prior to purging the well and sampling for Monitoring Parameters may be used to fulfill this requirement. Groundwater elevations for all upgradient and down gradient wells for a given groundwater body shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater gradient and direction. The results of groundwater elevation monitoring shall be displayed on a water table contour map and/or groundwater flow net for the site and included in each monitoring report. The Discharger shall use the groundwater elevation monitoring data to determine the following:

A. The groundwater flow velocity
B. The gradient direction in the upper aquifer, and in any additional zone of saturation monitored pursuant to this MRP
C. Times of highest and lowest elevations of the water levels in the wells
D. Separation of groundwater from the lowest point of the unit

The results of these determinations shall be included in the semi-annual reports.

2. Background Monitoring (Section 20415(b)(1)(A))

The Discharger shall install and operate a sufficient number of Background Monitoring Points at appropriate locations and depths to yield ground water samples from the uppermost aquifer that represent the quality of ground water that has not been affected by a release from the units per Section 20415(b)(1)(A) of Title 27.

A. Monitoring Points: MWs-3, 4 and any future wells installed upgradient of the landfill for background monitoring.

B. Monitoring Schedule: As specified in Table E.3B.

Background monitoring data analysis shall include developing/updating concentration limits for statistical monitoring parameters and COCs, as necessary.

3. Corrective Action Monitoring (Sections 20425 and 20430)

The Discharger shall install and operate a groundwater corrective action monitoring system for the purpose of monitoring the nature and extent of the release and the progress of corrective action. A sufficient number of samples shall be taken from all Monitoring Points and Background Monitoring Points to satisfy the data analysis requirements for a given Reporting Period, and shall be taken in a manner that ensures sample independence to the greatest extent feasible. Collection and analysis of samples shall be in accordance with procedures set forth in the Sampling Collection and Analysis Plan per Monitoring Specification E.5 of the WDRs.

A. Monitoring Points: MWs-1, 2, 5

The corrective action monitoring locations shall include any future wells installed along the point of compliance, down gradient, and/or side gradient of the unit to monitor the nature and extent of the release and/or progress of corrective action.

B. Monitoring Schedule

Groundwater samples shall be collected and analyzed in accordance with the following schedule:

Table E.3B
Corrective Action Monitoring Schedule

Parameter	Units	Frequency	Monitoring Approach	
Field Parameters			Nature/Extent	Trends
Elevation	Feet MSL	Quarterly	---	---
Specific Conductance	µMhos/cm	Semiannually	---	---
pH	pH units	Semiannually	---	---
Temperature	^{o}C	Semiannually	---	---
Turbidity	NTU	Semiannually	---	---
Monitoring Parameters (Attachment C)				
General Minerals:				
TDS	mg/L	Semiannually	Interwell	Intrawell
Chloride	mg/L	Semiannually		
Sulfate	mg/L	Semiannually		
Total Alkalinity	meq/L	Semiannually	Interwell	Intrawell
Total Hardness	mg/L	Semiannually	Interwell	Intrawell
Major Anions	mg/L	Annually	Interwell	Intrawell
Major Cations	mg/L	Annually	Interwell	Intrawell
Dissolved Inorganics	µg/L	Every 2 years		
VOCs	µg/L	Every 2 years	Intrawell	Intrawell
Constituents of Concern (Attachment D)				

Five-year COC monitoring under this Order shall be conducted by 15 November 2005 and at least every five years thereafter.

C. Monitoring Data Analysis

Monitoring data analysis shall be include the following:

a. Background Data
   - Updating concentration limits for statistical monitoring parameters and COCs, as necessary.

b. Nature and Extent of Release
   - Comparisons with concentration limit to identify any new or previously undetected constituents at a monitoring point
   - Water chemistry analysis by appropriate methods (i.e. ion balance, Piper diagram, Stiff diagram etc.).
   - Preparation of contaminant contour maps for representative constituents of the release.

b. Effectiveness of Corrective Action
   - Preparation of time series plots for representative constituents
   - Trend analysis for each constituent using appropriate statistical and graphical methods (e.g., Mann-Kendall).
   - Comparison of contaminant contour maps for representative constituents of the release showing historical changes in plume size and concentrations.

The results of the above analysis, including a narrative discussion, shall be included in each semiannual report and summarized in the Annual Report, as specified under Reporting B.2, above. The semiannual monitoring report shall also include a discussion of the progress of corrective action toward returning to compliance with the Water Quality Protection Standard, as specified in Section 20430(h) of Title 27.

F. FACILITY MONITORING

1. Standard Observations

Standard Observations shall be performed **monthly** during the wet season (October 1 to April 30) and **quarterly** during the dry season (May 1 to September 30) and shall include those elements identified in Reporting Requirement F.4.f of the WDRs. Each monitoring report shall include a summary and certification of completion of all Standard Observations. Field logs of standard observations shall also be included in the report.

2. Regular Maintenance Inspections

Landfill facilities (i.e. monitoring wells) shall be inspected **quarterly** to identify the need for maintenance and repairs. Necessary repairs shall be completed within 30 days of each inspection. Field logs of these inspections and documentation of the repairs shall be included in each semiannual monitoring report.

3. After Storm Events

Within seven days following each significant storm event (i.e. one which produces 2.0 inches or more of precipitation within a 24-hour period, as measured at the Rio Vista Station), the Discharger shall inspect the landfill cover and precipitation and drainage facilities for damage. Areas of erosion or sedimentation observed during the inspection(s) shall be flagged and repaired within seven days of identification. If repairs cannot be completed within the seven-day time frame, the Discharger shall notify the Regional Board of such and provide a schedule for completing necessary

repairs. Findings and repairs implemented as a result of these inspections shall be included in each semiannual monitoring report. If no inspection was conducted because there was no significant storm event during the semiannual period, the report shall state such fact.

4. **Site Winterization**
   Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility for the purpose of winterizing the site. The inspection shall identify any damage to the landfill cover, grade, precipitation and drainage controls, access roads and other landfill facilities. Any necessary construction, maintenance, or repairs to these facilities shall be completed by **31 October**. The Discharger shall document the results of the winterization inspection and any repair measures implemented in the Annual Report due by **31 January** of each year.

Documentation of the results of the above inspections and any repairs implemented shall include field observations, the location of any damage observed (i.e. on a site map), photographs of the damage, and a description of any repairs implemented, including post-repair photographs.

The Discharger shall implement the above monitoring program on the effective date of this Program.

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

_____
(Date)

Attachments
JDM: